bars **104** and submounts **102** are arranged in alternating order so the laser diode bars **104** are electrically connected in series. An end block **106** supports the submounts **102** and provides electrical power to the first submount **102**. The submounts **102** are thermally coupled to a heat exchanger **108** to allow thermal transmission of heat generated by the laser diode bars **104** to the heat exchanger **108**. An internal network of conduits in the heat exchanger **108** allows circulation of coolant to assist in dissipation of heat. The heat exchanger **108** in this example is a thermally conductive material such as copper for maximum thermal conduction.

[0029] FIG. **3**A shows a close up side view of two sets of the submounts **102** and laser diode bars **104** in FIG. **2**. FIG. **3**B shows an exploded view of the components of the submounts **102** and the laser diode bars **104** in FIG. **3**A. The laser diode bars **104** each have a p-side contact and an opposite n-side contact and emit laser light when electrical current is applied between the p-side contact and the n-side contact. It is to be understood that the submounts **102** are similar and the below description relating to the top submount **102** in FIG. **3**A applies to the other submounts **102** in FIG. **2**.

[0030] A core **302** of the submount **102** is fabricated from a dielectric material that also possesses a high thermal conductivity such as Aluminum Nitride (AlN), Beryllium Oxide (BeO) or CVD Diamond. In this example, the core **302** is fabricated from BeO. The submount core **302** has a roughly rectangular slab-like shape with a first side surface **312** and an opposite side surface **314**. A top surface **316** is opposite to a bottom surface **318** that is coupled to the top surface **120** of the heat exchanger **108** in FIG. **2**.

[0031] The side surface **312** includes an electrically conductive pad or layer such as a metal layer **322** that extends over part of the side surface **312**. Similarly, the side surface **314** includes an electrically conductive pad or layer **324** that extends over part of the side surface **314**. Thus, the side surface **312** includes an exposed area **326** adjacent to the bottom surface **318** and the opposite side surface **314** includes an exposed area **328** adjacent to the bottom surface **318** to provide electrical isolation between the metal layers **322** and **324** and the heat exchanger **108**. The metal layers **322** and **324** may be applied by plating, sputtering or metal evaporation. In this example, the metal layers **322** and **324** are predominantly copper but other electrically conductive elements and/or their respective alloys, including gold, nickel, titanium, platinum, etc. may be used. In this example, the distance between the side surfaces **312** and **314** may range between 0.4 and 2.00 mm with the distance in FIG. **3**A being 1.5 mm and 2.4 mm between the top surface **316** and the bottom surface **318**. The side surfaces **312** and **314** are approximately 10 mm wide. The metal layers **332** and **334** are approximately 0.015 mm thick.

[0032] The metal layer **322** serves as the mounting surface and electrical contact for one side of the diode bar **104** and the layer **324** interfaces the side of the adjacent diode bar **104** on the next submount **102** as shown in FIG. **3**A. A layer of pre-deposited solder **330** is applied to join the metal layer **322** to either the n-side contact or the p-side contact of the laser diode bar **104**. In this example, the pre-deposited solder **330** and therefore the metal layer **322** is electrically in contact with p-side contact of the laser diode bar **104**. Each metal layer **322** and **324** extends from one side (emitting facet) of the laser diode bar **104** to approximately the opposite side (HR facet) of the laser diode bar **104**. A solder foil **332** is applied to join the metal layer **324** to either the n-side contact or the p-side contact of the next laser diode bar **104**. The n-side contact or the p-side contact of the next laser diode bar **104** joined to the metal layer **324** will be the opposite of the p-side contact or the n-side contact of the laser diode bar **104** joined to the metal layer **322**. In this example, the n-side contact of the next laser diode bar **104** is joined to the metal layer **324** via the solder foil **332**.

[0033] The two metal layers **322** and **324** are electrically connected to each other to provide a series connection between the diode bars **104** on the top and the bottom of the submounts **102**. In this example, the top surface **316** includes a metal layer **334** that is joined to the layers **322** and **324** to allow electrical conduction between the layers **322** and **324**. The metal layers **322**, **324** and **334** may be a single sheet that is wrapped around the core **302** on the respective side surfaces **312** and **314** and the top surface **316**. As shown in FIG. **3**A, a lateral side surface **344** between the top and bottom surfaces **312** and **314** of the submount core **302** is exposed without a covering metal layer. The lateral side surface (not shown) opposite the pictured lateral side surface **344** is also exposed. A metal layer **338** is applied to the bottom surface **318** of the submount core **302** to allow it to be soldered to the heat exchanger **108** via a solder layer **340**. The metal layer **338** is electrically isolated from the top and bottom layers **322** and **324** by the exposed areas **326** and **328** of the core **302**. In this example, the distance from the lowermost end of the continuous electrically conductive metal layers **322** and **324** to the bottom metal layer **338** is between about 20% to 40% of the distance between the top surface **316** and the bottom surface **318**. In this example, the solder layers **330** and **332** may be 75/25 Au—Sn pre-deposited solder or solder foil on the metal layers **322** and **324**. The 75/25 Au—Sn solder changes to an 80/20 mix by diffusing gold from the laser diode **104** during the heating process in assembling the diode array. The solder may also be an 80/20 Au—Sn pre-deposited solder or preform solder. The solder in the solder layer **340** is a lower temperature solder such as indium.

[0034] Each bar **104** and its submount **102** in FIG. **1** may be considered a laser diode package. The laser diode array **100** is therefore assembled from multiple packages. Each laser diode package may then be inspected before assembling the overall array. Adjacent laser packages are soldered via a gold/tin foil piece placed between the submount **102** on one laser diode package and the laser diode **104** of the adjacent package.

[0035] As shown in detail in FIG. **3**A, the laser diode bars **104** are electrically isolated from a top surface **120** of the heat exchanger **108** in FIG. **2**. Each of the submounts **102** includes a core dielectric material and electrically conductive pads or layers partially covering surfaces of the core that serve as the mounting surfaces and electrical contact of the side of the laser diode bars **104**. The conductive pad or layer on one side of the core is connected to another conductive pad or layer on the other side of the core that partially covers the opposite surface of the submount **102** and serves as an electrical contact for the side of the next laser diode bar **104** in sequence. Since the conductive pads only cover part of the surface of the submount **102**, the laser diode bars **104** are electrically insulated from the heat exchanger **108** as shown in FIG. **3**A. In this manner, the submounts **102** are thermally conductive to the heat exchanger **108** and carry current from